

Remarks

I. 35 U.S.C. §103

A. Claims 1, 3-4, 6-7, 21, 23-24 and 26-33

Claims 1, 3-4, 6-7, 21, 23-24 and 26-33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,650,640 to Muller et al. (hereinafter “Muller”) in view of U.S. Published Application No. 2001/0048681 to Bilic et al. (hereinafter “Bilic”). Regarding claim 1, the Office Action states:

As per claim 1, Muller discloses an interface device for a computer, the interface device connectable to a network and a storage unit, the storage unit including a disk drive, the interface device comprising:

- A sequencer including a hardware logic circuit configured to process a transport layer header of a network packet (column 4, lines 48-50, column 7, lines 20-25, 31-35, 64-67, column 8, lines 1-5, 17-20, 50-60, column 9, lines 1-5, column 15, lines 35-38, column 35, lines 53-67, column 36, lines 1-30);
- A memory adapted to store control information regarding a network connection being handled by said device (column 4, lines 20-25, column 9, lines 14-16, 20-25, 56-58, column 10, lines 1-7, column 11, lines 46-59, column 12, lines 11-15, column 52, lines 64-67, column 53, lines 1-7);
- A mechanism for associating said packet with said control information (column 4, lines 45-50, 58-67, column 8, lines 50-60, 66-67, column 9, lines 13-17, 22-35, 66-67, column 10, lines 2-7, column 11, lines 46-59, column 12, lines 11-15, column 16, lines 59-67).

Muller does not explicitly disclose:

- selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.

However, in an analogous art, Bilic discloses a protocol processor arranged to select the group of packets for reassembly depending on which of the communication protocols was used in transmitting the packets. It controls the host interface logic so to write the data packets that do not belong to the identified group to the host memory without reassembly processing by the network interface device (paragraphs [0013, 0023, 0026, 0043, 0046]).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Bilic’s selecting whether to process packet or send to storage, thereby avoiding the computer in Muller’s system to reduce the burden of frame reassembly imposed on the host processor.

The Office Action admits that Muller does not disclose “selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.” Applicants respectfully assert that Bilic also does not disclose this limitation. Note that claim 1, for example, includes the limitation of “the storage unit including a disk drive.” None of the paragraphs of Bilic cited by the Office Action teach or suggest “selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer,” wherein “the storage unit includ(es) a disk drive.” Instead, as noted in paragraph [0013] of Bilic, “In some preferred embodiments of the present invention, the embedded processor is programmed to process TCP/IP and UDP/IP headers, and thus to reassemble TCP and UDP frames (or segments) in the host memory. Packets transferred using other protocols are passed through to the host processor without header processing or reassembly.”

In other words, Bilic does not even suggest that packets transferred using different protocols go to different memories, but rather states that all the packets go to the host memory, albeit with different processing. Moreover, Bilic does not teach or suggest that certain packets “avoid... the computer,” as recited in claim 1. Beyond that, Bilic certainly does not teach or suggest that data from a packet are sent to “a storage unit, the storage unit including a disk drive,” as recited in claim 1. Because neither Muller nor Bilic teach or suggest “a mechanism for ... selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer,” applicants respectfully assert that claim 1 and all the claims that depend from claim 1 are nonobvious over Muller in view of Bilic.

Regarding claim 3, the Office Action states:

As per claim 3, Muller discloses the interface device of claim 1, further comprising a plurality of network ports, wherein one of the said network ports is connectable to the storage unit (column 4, lines 40-43, column 6, lines 37-40, column 7, lines 15-19, column 8, lines 40-43, column 9, lines 1-5, column 10, lines 65-67).

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 3 and respectfully assert that none of those passages teaches or suggests “The interface device of claim 1, further comprising a plurality of network ports, wherein

one of said network ports is connectable to the storage unit.” For example, column 4, lines 40-43 (and surrounding text) of Muller state:

Illustratively, a flow key comprises a combination of identifiers of the source and destination entities. In one embodiment of the invention a flow key is a combination of source and destination addresses extracted from the packet's layer three (e.g., IP or Internet Protocol) protocol header and source and destination port numbers extracted from the layer four (e.g., TCP) protocol header.

Because neither Muller nor Bilic teach or suggest “The interface device of claim 1, further comprising a plurality of network ports, wherein one of said network ports is connectable to the storage unit,” the Office Action has not presented a prima facie case of obviousness for claim 3.

Regarding claim 4, the Office Action states:

As per claim 4, Muller discloses the interface device of claim 1, further comprising a Fibre Channel controller connectable to the storage unit (column 61, lines 55-60).

Instead, column 61, lines 55-60 of Muller states:

Reserving sixty-four bytes at the beginning of a buffer also allows header information to be modified or prepended if necessary. For example, a regular Ethernet header of a packet may, because of routing requirements, need to be replaced with a much larger FDDI (Fiber Distributed Data Interface) header. One skilled in the art will recognize the...

Applicants respectfully assert that the above-quoted passage that was cited by the Office Action does not teach or suggest “the interface device of claim 1, further comprising a Fibre Channel controller connectable to the storage unit,” as recited in claim 4. For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 4.

Regarding claim 6, the Office Action states:

As per claim 6, Muller discloses the network interface device of claim 1, further comprising a file cache adapted to store said data (column 56, lines 20-30, column 58, lines 26-30, column 61, lines 34-35, column 62, lines 47-52).

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 6. Without reprinting each of those passages here, suffice it to say that

applicants respectfully assert that none of those passages teaches or suggests “the interface device of claim 1, further comprising a file cache adapted to store said data.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 6.

Regarding claim 7, the Office Action states:

As per claim 7, Muller further discloses the interface device of claim 1, further comprising a file cache adapted to store said data under control of a file system in the host (column 56, lines 20-30, column 58, lines 26-30, column 61, lines 34-35, column 62, lines 47-52).

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 7 and respectfully assert that none of those passages teaches or suggests “The interface device of claim 1, further comprising a file cache adapted to store said data under control of a file system in the host.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 7.

Regarding claim 21, the Office Action states:

As per claim 21, Muller discloses an interface device for a computer, the interface device connectable to a network and a storage unit, the storage unit including a disk drive, the interface device comprising:

- A receive mechanism that processes a Transmission Control Protocol (TCP) header of a network packet (column 4, lines 48-50, column 7, lines 20-25, 31-35, 64-67, column 8, lines 1-5, 17-20, 50-60, column 9, lines 1-5, column 15, lines 35-38, column 35, lines 53-67, column 36, lines 11-30);
- A memory storing a combination of information describing an established TCP connection (column 4, lines 20-25, column 9, lines 14-16, 20-25, 56-58, column 10, lines 1-7, column 11, lines 46-59, column 12, lines 11-15, column 52, lines 64-67, column 53, lines 1-7);
- A processing mechanism that associates said packet with said information (column 4, lines 45-50, 58-67, column 8, lines 50-60, 66-67, column 9, lines 13-17, 22-35, 66-67, column 10, lines 2-7, column 11, lines 46-59, column 12, lines 11-15, column 16, lines 59-67).

Muller does not explicitly disclose:

- selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.

Bilic discloses a protocol processor arranged to select the group of packets for reassembly depending on which of the communication protocols was used in transmitting the packets. It controls the host

interface logic so to write the data packets that do not belong to the identified group to the host memory without reassembly processing by the network interface device (paragraphs [0013, 0023, 0026, 0043, 0046]).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate Bilic's selecting whether to process packet or send to storage, thereby avoiding the computer in Muller's system to reduce the burden of frame reassembly imposed on the host processor.

The Office Action admits that Muller does not disclose "selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer." Applicants respectfully assert that Bilic also does not disclose this limitation. Note that claim 21, for example, includes the limitation of "the storage unit including a disk drive." None of the paragraphs of Bilic cited by the Office Action teach or suggest "selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer," wherein "the storage unit includ(es) a disk drive." Instead, as noted in paragraph [0013] of Bilic, "In some preferred embodiments of the present invention, the embedded processor is programmed to process TCP/IP and UDP/IP headers, and thus to reassemble TCP and UDP frames (or segments) in the host memory. Packets transferred using other protocols are passed through to the host processor without header processing or reassembly."

In other words, Bilic does not even suggest that packets transferred using different protocols go to different memories, but rather states that all the packets go to the host memory, albeit with different processing. Moreover, Bilic does not teach or suggest that certain packets "avoid... the computer," as recited in claim 21. Beyond that, Bilic certainly does not teach or suggest that data from a packet are sent to "a storage unit, the storage unit including a disk drive," as recited in claim 21. Because neither Muller nor Bilic teach or suggest "a mechanism for ... selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer," applicants respectfully assert that claim 21 and all the claims that depend from claim 21 are nonobvious over Muller in view of Bilic.

Regarding claim 23, the Office Action states:

As per claim 23, Muller discloses the interface device of claim 21, further comprising a Fibre Channel controller connectable to the storage unit (column 61, lines 55-60).

Applicants initially note that claim 23 recites:

The interface device of claim 21, further comprising a plurality of network ports, wherein one of said network ports is connectable to the storage unit.

In contrast, column 61, lines 55-60 of Muller recite:

Reserving sixty-four bytes at the beginning of a buffer also allows header information to be modified or prepended if necessary. For example, a regular Ethernet header of a packet may, because of routing requirements, need to be replaced with a much larger FDDI (Fiber Distributed Data Interface) header. One skilled in the art will recognize the...

Applicants respectfully assert that the above-quoted passage that was cited by the Office Action does not teach or suggest “the interface device of claim 21, further comprising a plurality of network ports, wherein one of said network ports is connectable to the storage unit,” as recited in claim 23. For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 23.

Regarding claim 24, the Office Action states:

As per claim 24, Muller discloses the network interface device of claim 1, further comprising a file cache adapted to store said data (column 56, lines 20-30, column 58, lines 26-30, column 61, lines 34-35, column 62, lines 47-52).

Applicants initially note that claim 24 recites:

The interface device of claim 21, further comprising a Fibre Channel controller connectable to the storage unit.

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 24 and respectfully assert that none of those passages teaches or suggests “the interface device of claim 1, further comprising a Fibre Channel controller connectable to the storage unit.” Nor does the passage of Muller cited by the Office Action with regard to claim 23 (column 61, lines 55-60) teach or suggest the limitations of claim 24. For at least these reasons, the Office Action has not presented a prima facie case of obviousness for claim 24.

Regarding claim 26, the Office Action states:

As per claim 26, Muller discloses the network interface device of claim 21, further comprising a file cache adapted to store said data (column 56, lines 20-30, column 58, lines 26-30, column 61, lines 34-35, column 62, lines 47-52).

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 26. Without reprinting each of those passages here, suffice it to say that applicants respectfully assert that none of those passages teaches or suggests “the interface device of claim 21, further comprising a file cache adapted to store said data.” Instead, some of those passages teach a cache for descriptors. For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 26.

Regarding claim 27, the Office Action states:

As per claim 27, Muller further discloses the interface device of claim 21, further comprising a file cache adapted to store said data under control of a file system in the host (column 56, lines 20-30, column 58, lines 26-30, column 61, lines 34-35, column 62, lines 47-52).

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 27 and respectfully assert that none of those passages teaches or suggests “The interface device of claim 21, further comprising a file cache adapted to store said data under control of a file system in the host.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 27.

Regarding claim 28, the Office Action states:

As per claim 28, Muller discloses a method for operating an interface device for a computer, the interface device connectable to a network and a storage unit, the storage unit including a disk drive, the method comprising:

- Receiving, by the interface device from the network, a packet containing data and a Transmission Control Protocol (TCP) header (column 4, lines 48-50, column 7, lines 20-25, 31-35, 64-67, column 8, lines 1-5, 17-20, 50-60, column 9, lines 1-5, column 15, lines 35-38, column 35, lines 53-67, column 36, lines 11-30);
- Processing, by the interface device, the TCP header (column 4, lines 45-50, 58-67, column 8, lines 50-60, column 9, lines 13-17, 22-35, 66-67);
- Storing, on the interface device, information regarding a TCP connection (column 4, lines 20-25, column 9, lines 14-16, 20-25,

56-58, column 10, lines 1-7, column 11, lines 46-59, column 12, lines 11-15);

- Associating, by the interface device, the packet with the TCP connection (column 35, lines 53-67, column 36, lines 11-30);

Muller does not explicitly disclose:

- Selecting, by the interface device, whether to process the packet by the computer or to send the data from the packet to the storage unit, thereby avoiding the computer.

The Office Action admits that Muller does not disclose “selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.” Applicants respectfully assert that Bilic also does not disclose this limitation. Note that claim 28, for example, includes the limitation of “the storage unit including a disk drive.” None of the paragraphs of Bilic cited by the Office Action teach or suggest “selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer,” wherein “the storage unit includ(es) a disk drive.” Instead, as noted in paragraph [0013] of Bilic, “In some preferred embodiments of the present invention, the embedded processor is programmed to process TCP/IP and UDP/IP headers, and thus to reassemble TCP and UDP frames (or segments) in the host memory. Packets transferred using other protocols are passed through to the host processor without header processing or reassembly.”

In other words, Bilic does not even suggest that packets transferred using different protocols go to different memories, but rather states that all the packets go to the host memory, albeit with different processing. Moreover, Bilic does not teach or suggest that certain packets “avoid... the computer,” as recited in claim 28. Beyond that, Bilic certainly does not teach or suggest that data from a packet are sent to “a storage unit, the storage unit including a disk drive,” as recited in claim 28. Because neither Muller nor Bilic teach or suggest “a mechanism for ... selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer,” applicants respectfully assert that claim 28 and all the claims that depend from claim 28 are nonobvious over Muller in view of Bilic.

Regarding claim 29, the Office Action states:

As per claim 29, Muller discloses the method of claim 28, further comprising creating, by the computer, the information regarding the TCP connection (column 5, lines 35-45).

Applicants have reviewed the passage from Muller that the Office Action cites regarding claim 29, and respectfully assert that column 5, lines 35-45 does not teach or suggest “the method of claim 28, further comprising creating, by the computer, the information regarding the TCP connection.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 29.

Regarding claim 30, the Office Action states:

As per claim 30, Muller discloses the method of claim 28, wherein the interface device includes a network port, and the packet is received via the port and the data is sent to the storage unit via the port (column 10, lines 1-7).

Applicants have reviewed the passage from Muller that the Office Action cites regarding claim 30, and respectfully assert that column 10, lines 1-7 do not teach or suggest “the method of claim 28, wherein the interface device includes a network port, and the packet is received via the port and the data is sent to the storage unit via the port.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 30.

Regarding claim 31, the Office Action states:

As per claim 31, Muller discloses the method of claim 28, wherein the interface device includes first and second network ports, and the packet is received via the first port and the data is sent to the storage unit via the second port (column 10, lines 35-47).

Applicants have reviewed the passage from Muller that the Office Action cites regarding claim 31, and respectfully assert that column 10, lines 35-47 do not teach or suggest “the method of claim 28, wherein the interface device includes first and second network ports, and the packet is received via the first port and the data is sent to the storage unit via the second port.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 31.

Regarding claim 32, the Office Action states:

As per claim 32, Muller discloses the method of claim 28, further comprising storing the data on a file cache of the interface device (column 56, lines 20-30, column 58, lines 26-30, column 61, lines 34-35, column 62, lines 47-52).

Applicants have reviewed the passages from Muller that the Office Action cites regarding claim 32, and respectfully assert that the passages do not teach or suggest “the method of claim 28, further comprising storing the data on a file cache of the interface device.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 32.

Regarding claim 33, the Office Action states:

As per claim 33, discloses the method of claim 28, further comprising adding a network protocol header to the data for sending the data to the storage unit (column 9, lines 50-67).

Applicants have reviewed the passage from Muller that the Office Action cites regarding claim 33, and respectfully assert that this passage does not teach or suggest “the method of claim 28, further comprising adding a network protocol header to the data for sending the data to the storage unit.” For at least this reason, the Office Action has not presented a prima facie case of obviousness for claim 33.

B. Claims 2, 5, 22 and 25

Claims 2, 5, 22 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Muller in view of Bilic and further in view of U.S. Patent No. 6,065,096 to Day et al. (hereinafter “Day”). Regarding claims 2 and 22, the Office Action states:

As per claims 2 and 22, Muller, in view of Bilic, discloses the interface device of claims 1 and 21.

Muller does not explicitly disclose the interface further comprising a SCSI controller connectable to the storage unit.

However, Day discloses SCSI interface channels attached to disk drives (column 2, lines 40-54, 55-67).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate in Muller’s device Day’s interface comprising a SCSI controller in order to provide for a simple, lower cost RAID controller architecture to enable lower cost and complexity associated with high performance and high reliability storage subsystems.

As noted above regarding claim 1, Muller in view of Bilic does not teach or suggest “a mechanism ... for selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.”

Similarly, regarding claim 21, Muller in view of Bilic does not teach or suggest “a processing mechanism that ... selects whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.” Day also does not teach or suggest either of these limitations. Implementing or incorporating in Muller’s device Day’s interface as proposed by the Office Action would not solve this deficiency.

Moreover, the motivation asserted by the Office Action to make this modification is quoted from Day at column 2, lines 51-54, which refers to an alternative storage configuration, not anything involving network communication. Applicants respectfully assert, however, that somehow implementing or incorporating in Muller’s device Day’s interface would increase the cost and complexity of Muller’s device without any obvious benefit. Muller’s device “relates to a network interface circuit (NIC) for processing communication packets exchanged between a computer network and a host computer system” (column 1, lines 51-54). Day’s RAID controller, on the other hand, provides a chip for controlling a redundant array of inexpensive disk drives (column 1, lines 11-19; column 2, lines 11-24). Stated differently, Muller involves network communication and Day involves storage. Absent the teachings of the present invention, no motivation is apparent in the cited references to make the modification proposed by the Office Action. For at least these reasons, applicants respectfully assert that the Office Action has not presented a prima facie case of obviousness for claims 2 or 22.

Regarding claims 5 and 25, the Office Action states:

As per claims 5 and 25, Muller, in view of Bilic, discloses the interface device of claims 1 and 21.

Muller, in view of Bilic, does not explicitly disclose the interface further comprising a RAID controller connectable to the storage unit.

However, Day discloses a RAID controller that integrates onto a single integrated circuit of a general purpose processor (column 2, lines 11-25, 55-67).

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to implement or incorporate in Muller’s device Day’s interface comprising a RAID controller allowing the disk interface connections and protocols to be more flexibly selected but at the cost of less integration within the circuit.

As noted above regarding claim 1, Muller in view of Bilic does not teach or suggest “a mechanism ... for selecting whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.” Similarly, as noted above regarding claim 21, Muller in view of Bilic does not teach or suggest “a processing mechanism that ... selects whether to process said packet by said computer or to send data from said packet to the storage unit, thereby avoiding the computer.” Day also does not teach or suggest either of these limitations. Implementing or incorporating in Muller’s device Day’s interface as proposed by the Office Action would not solve this deficiency.

Moreover, the motivation asserted by the Office Action to make this modification is quoted from Day at column 2, lines 51-54, which refers to an alternative storage configuration, not anything involving network communication. As mentioned above, somehow implementing or incorporating in Muller’s device Day’s interface would increase the cost and complexity of Muller’s device without any obvious benefit. Muller’s device “relates to a network interface circuit (NIC) for processing communication packets exchanged between a computer network and a host computer system” (column 1, lines 51-54). Day’s RAID controller, on the other hand, provides a chip for controlling a redundant array of inexpensive disk drives (column 1, lines 11-19; column 2, lines 11-24). Stated differently, Muller involves network communication and Day involves storage. Absent the teachings of the present invention, no motivation is apparent in the cited references to make the modification proposed by the Office Action. For at least these reasons, applicants respectfully assert that the Office Action has not presented a prima facie case of obviousness for claims 5 or 25.

II. Conclusion

Applicants have shown that the Office Action has not presented a prima facie case of obviousness for any of the claims. As such, applicants respectfully assert that the application is in condition for allowance, and a notice of allowance is solicited.

Respectfully submitted,

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 13, 2007.

Date: 6-13-07



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